

April 2002

This edition of the Significant Events Report includes a request for input from the Diversity Committee, a profile of Vivian Owens, a feature article about the Castlemont and Arroyo High School's Robotics Club, and an account of a major milestone reached by the Spallation Neutron Source project team. We welcome suggestions at any time for feature articles and profiles. Submissions and suggestions should be directed to: ser@lbl.gov.

Division Director's Comments

We have been working to modernize our engineering infrastructure for the past three years, with some progress being made in areas such as organization, CAD software and support, computer workstations, and network bandwidth. There are many other areas that we are working on or planning to work on, in the near future. Some of the issues that we would like to address include, but are not limited to, the following:

- Diversity and workplace environment
- Modernization of the shops (includes equipment, space and methodology)
- Understanding fabrication costs
- Improving our manufacturing engineering expertise and outsourcing capabilities
- Implementing new fabrication and design capabilities (rapid prototyping, MEMS, precision machining, etc.)
- Increase direct funding
- Career development and succession planning
- Consolidation and cleaning of shop space
- ES&H (reduction/elimination of hazardous waste)

I will be working with the department heads and senior managers to complete a written strategy for the Engineering Division that will be communicated to the division staff in the July SER and through department meetings. Our strategic plan to continue modernizing the division infrastructure and position ourselves to support the ever-changing scientific mission of the Laboratory, will include a description of the current state, the desired state, and how we intend to get there in the next five years. If any of you have constructive ideas along these lines, get them to your department head or send them directly to me via email, and I will consider them as we construct this strategy.

The table on the following page is an example showing some of our strategic issues for the shops and how we intend to address them.

Lawrence Berkeley National Laboratory
Engineering Division
Significant Events Report
April 2002

Desired State	Strategies	Objectives	Tactics (Tasks)
Modern equipment w/state-of-the-art tooling and highly trained staff, using the latest methodologies and performing fabrications not possible anywhere else.	Work with Procurement on methods to finance new machinery.	Replace all obsolete equipment with state-of-the-art precision equipment. Develop design methodologies and train staff to effectively utilize new equipment.	Lobby for higher percentage of GPE for next 5 years. Develop leasing capability for fabrication equipment. Establish an entry-level training program. Research and establish state-of-the-art new fabrication and design methodologies. Develop training plans and train staff on new machines and methodologies.
Clean, safe, and environmentally controlled space with "clean" power suitable for modern precision equipment.	Develop a clean-up program for all shops.	Clean space. Paint wall and floors where appropriate. Add environmental equipment and controls where applicable. Add clean power.	Establish major clean-up program throughout the shops involving all staff. Remove all unneeded junk and equipment. Work with facilities to add environmental control equipment in appropriate areas. Work with Facilities to add clean power to Building 77.
100 mbs Ethernet access between all engineers, managers, shops, and CNC machines, no matter where they are located within the laboratory.	Work closely with IT to implement a workable network upgrade plan.	Upgrade inter-building and internal engineering networks.	Upgrade the network in shops by bringing network services directly to machines. Work with IT to upgrade the lab inter-building infrastructure to universal (GIGE). Install Cat 5 cabling and clean-up networks within buildings to enable 100 BT to all workstations.



News

DesignWorks Featured in Currents

DesignWorks was prominently featured in a recent edition of *Berkeley Lab Currents* ([March 22, 2002](#)). Division-wide efforts to change the perception of Engineering within the laboratory, and the capabilities of the DesignWorks group, were the focus of the article.

Professors from Chico State Visit Lab

Victor Karpenko recently invited the Associate Dean and five professors from the Chico State College of Engineering, Computer Science and Technology to visit the Laboratory. During a morning session that included Alan Biocca, Peter Denes, Deb Hopkins, Joe Jaklevic, Ken Chow, Norman Salmon, and Daryl Oshatz, the group explored areas of mutual interest and discussed collaboration opportunities for faculty and students. Afternoon tours were followed by a wrap-up session to outline the next steps in establishing a longterm collaborative relationship.

Division Capabilities Presented at Livermore

In an effort to promote a solid working relationship with other national laboratories, Jim Triplett, Joe Jaklevic, Victor Karpenko, and Peter Denes presented Engineering Division's capabilities to key staff at Lawrence Livermore National Laboratory. "We would like to be in a better position to collaborate on future projects with other labs, particularly Livermore," states Victor Karpenko, Mechanical Engineering Department Head. "One thing we have been able to do is establish an open purchase order between the two labs to facilitate a quick and easy exchange of personnel."

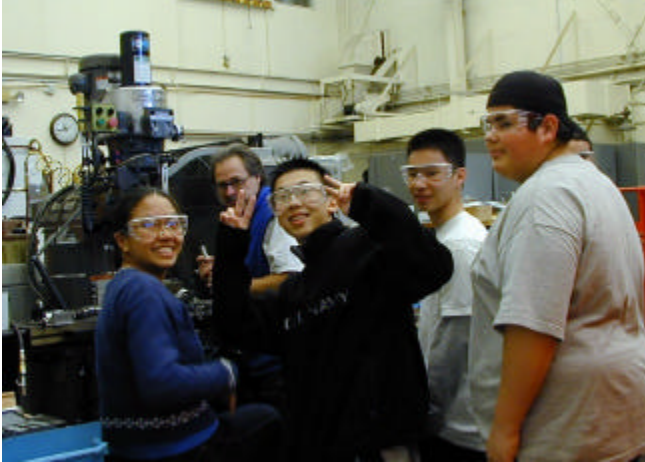
Cryo3 Radiation Detector Profiled on DOE Website

The Cryo3, a hand-held, 10-pound radiation detector developed in collaboration with the Lawrence Livermore and Los Alamos National Laboratories, was recently profiled on the Department of Energy's website. The article focuses on the use of small detectors in security and anti-terrorism applications. The full text of the article can be found at: http://www.er.doe.gov/feature_articles_2002/March/Cryo3/Cryo3.htm.

Features

“Friggin’-A It Works!”- Deb Hopkins and Paul Harris

Members of the Technical Integration Group (TIG) and Industry and Energy Partnerships



Hybrid team members with TIG’s Mario Cepeda.

have been volunteering their time to collaborate with the Robotics Team from Castlemont and Arroyo High Schools (*Significant Events Report*, January 2002). Led by extremely dedicated Castlemont teachers Erin Carlson, Kenneth Mason, and David Upchurch, the “Hybrids” recently completed construction of their third robot, and competed in the FIRST (For Inspiration and Recognition of Science and Technology) Robotics Competition.

The competition, created by 2002 World Hall of Fame for Engineering, Science, and Technology inductee, Dean Kamen, was established to foster an appreciation of science and technology among students and their communities. Currently in its eleventh year, the competition is a nationwide event that reaches more than 20,000 students, representing over 650 teams in 17 regional playoffs. Students participating this year are eligible for \$1.7 million in scholarships. The championship event was held April 25-27 at Walt Disney World’s Epcot Center in Orlando.

The rules for this year’s competition were released on January 5th when each team received their robot building kits. The kits included wheels, several types of motors, wire, hydraulic cylinders, and a programmable control module.



The team had just six weeks to design, build, and test their robot. With the exception of wheel bushings and motor mounts machined by TIG, team members constructed their robot out of wood and sheet metal using hand tools. Several Hybrids visited TIG in Building 25 to design and build the robot’s drive train. Engineering Division volunteers traveled to Castlemont in Oakland on Tuesdays and Saturdays for the team’s working sessions.

Lawrence Berkeley National Laboratory
Engineering Division
Significant Events Report
April 2002



Fund raising activities included a carwash.

In the interim between the time that the robot was completed and shipped, and the competition in San Jose, the team focused its efforts on game strategy and fund raising. The entry fee for the competition is several thousand dollars; the team must also raise funds for small parts, t-shirts, and travel.

The three-day regional competition at San Jose State University began by unpacking the robot, establishing a workstation in the 'pit,' and passing a rigorous safety and requirements inspection. Hundreds of students debated game strategies, shared tools, and exchanged pins, amid an intense rush of testing and making last-minute modifications to their robots. The competition is designed to foster teamwork and collaboration. Each event pairs two teams at random and allows them 60 seconds to formulate a cooperative strategy to score points. The object of this year's game, "Zone Zeal," was for the robots to race around a playing field gathering soccer balls in large wheeled baskets, and position the baskets and robots in scoring zones, all within a two-minute round.



The Hybrids competed in the FIRST regional robotics competition at San Jose State University



Lawrence Berkeley National Laboratory
Engineering Division
Significant Events Report
April 2002

The Hybrid robot's unique double-arm design allowed the robot to grab and control two baskets simultaneously. The robot performed as designed, successfully maneuvering the field with baskets in tow. A small problem with the release mechanism was corrected early in the competition. Although many teams relied on members to perform highly



Team members working with TIG's Jim O'Neill.



specialized roles, the Hybrid team opted for maximum participation, sending a different four-person team onto the playing field for each of the eight rounds.

Hybrid team members from Engineering Division included Brian Butler, Mario Cepeda, Luis Curtis, Bart Davis, Keith Franck, Paul Harris, Erick Herrarte, Deb Hopkins, Clifton Jones, Murat Karaca, Tom Miller, and Jim O'Neill. Erick and Deb accompanied the Hybrids to Disneyland in April to celebrate the team's success.



The current collaboration with the Hybrid team is just the first of many steps in building a long-term, year-round effort to work with teachers to fund and develop a robotics curriculum. Future efforts will include tutoring and fund raising. Commitment and resources are required to ensure continuity and develop a program that supports as many students and teachers as possible.



Celebrating at Disneyland

Profiles

Cleaning Up Engineering – Paul Harris

Vivian Owens is happy to be a part of the laboratory... so happy in fact, she threw a party to celebrate her first six months here. Employees occupying Building 46, where Vivian is the custodian, were invited to attend the special luncheon in January.



Barbecued chicken, baked beans, spaghetti, salad, and a wide variety of side dishes were on the menu. Vivian purchased, prepared and delivered the food for the anticipated 150 guests. She's no stranger to cooking for a large group of people; for the past three years she has been providing hot meals for the homeless in Jefferson Park in downtown Oakland. "The City told me I had to stop because I don't have a permit. I still sneak sandwiches, chips and drinks to them, though," she says. "I know what it's like to be out of work, and worried about where my next meal is coming from."

Vivian moved to California from Texas in 1975, to live with her sister. She attended Laney College in pursuit of her Business Administration degree, but soon dropped the course to have the first of three children (aged 24, 18, and 9). Following several bouts of chronic back pain, she had lumbar surgery in 1991. "The doctors said I might not walk again. What do they know? But you might see me on my hands and knees cleaning something around here, just to give my back a break."

Vivian says she enjoys the challenge of working at the lab. "It's so interesting, there is always something new going on, and I like contributing in my small way. I really like the flexibility; I get to set my own pace. My boss, [Facilities'] George Rosas, is the greatest." She also enjoys "the rapport with the people in Building 46."



Lawrence Berkeley National Laboratory
Engineering Division
Significant Events Report
April 2002



Photos courtesy of Robert Couto, TEID

The people in 46 enjoy and appreciate Vivian's work as well. In the most recent edition of *Facilities Quarterly* (January 2002), Engineering's Deb Hopkins was quoted, "She works very hard and is cleaning areas that I don't think have ever been touched before."

Vivian is so dedicated to the people of Building 46, that she is planning the upcoming retirement parties for two of the senior engineers, Art Ritchie and Al Lindner. She explains, "Art has been so good to me, he showed me around when I first got here, and he always shares his french bread and butter with me. Al is a real gentleman, and they are a dying breed. He shares food with me too. Everyone in Building 46 knows I like to eat!"

Service Recognition – Pamala Williams-Perkins

	January	February	March
35 Years		Joe Jaklevic	
25 Years		Bill Gath Eugene Veklerov Jon Zbasnik	Ashley Long Dave Plate
20 Years			Anita Whichard
10 Years	Alex Gavidia		Harold Yaver
5 Years		Dawn Munson Alex Ratti	

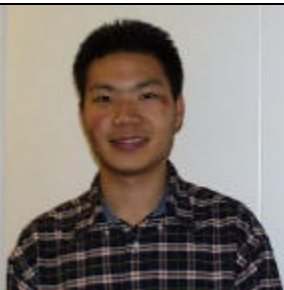
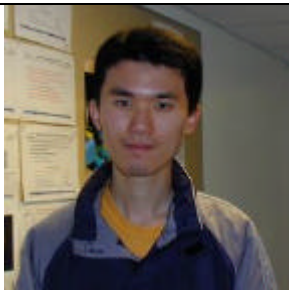
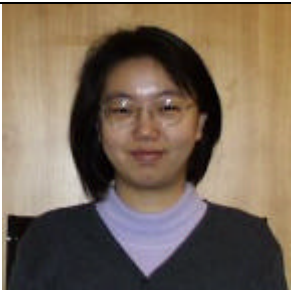

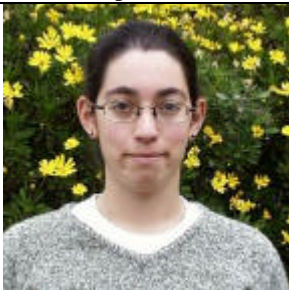
Retirees - Leslie Cobb

William Brown, Jr.
Gary Koehler



Lawrence Berkeley National Laboratory
Engineering Division
Significant Events Report
April 2002

Student Hires – Leslie Cobb

		
Heiko Bertsch Sensor Systems Technology Karlsruhe, Germany Working on CCD's for SNAP	George Chao Junior, Engineering Physics UC Berkeley Working with Jean-Marie Bussat in Electronics Engineering Department	Ming Wai Choy Junior, Elec. Eng., Comp Sci. UC Berkeley Working with Jim Ayers in Electronics Engineering Department
		
Jinghua Hao Master's Program, Computer Science Cal State Hayward Working on CXRO	Francois Lecerf Electronics Engineering Institut Supérieure d'Électronique du Nord, France Working with Henrik von der Lippe	Allison Ryan Junior, Mechanical Engineering UC Berkeley Working on the ATLAS Project



Significant Events

Student/Internship Committee – Bill Edwards

Job Fairs and Recruitment – Rita McLean

During the first two months of 2002, the Student/Internship Committee participated in five career fairs to recruit interns, co-ops, and summer students. We were well represented by all departments within Engineering at the following career fairs:

- The Engineering, Computing, and Physical Sciences Internship and Career Fair, UC Davis, January 24, 2002
- Evening with Industry, UCLA, January 24, 2002
- Opportunity Job Fair, Stanford University, January 26, 2002
- Diversity Fair, UC Berkeley, January 29
- The 18th Annual Technical & Business Job Fair, Chico State, February 7, 2002.

The resumes we received have been distributed to the department heads; if you have an opportunity for an intern or student and want to review the resumes, contact Rita McLean (interns) or Karen Paris (students). Anyone who would like to volunteer for future career fairs should contact Rita McLean.

Shadow an Engineer Program

Daryl Oshatz, Martin Pollard, and Ken Chow have volunteered to participate in the “Shadow an Engineer” Program sponsored by The Society of Women Engineers at UC Berkeley. The goal of the program is to encourage communication between professionals and students. It provides students, regardless of gender, the opportunity to visit company sites to observe the daily activities of practicing engineers. The program also gives companies the opportunity to inform students of professional opportunities and introduce them to the work environment and culture of the company.

Diversity Committee – Deb Hopkins

The Diversity Committee is reforming and is requesting your input. Although progress has been made in educational outreach and developing ties with the community, the committee is not satisfied that they have addressed workplace environment in a meaningful way. There is a consensus among committee members that diversity is too often posed as a recruitment problem, with too little attention paid to retention and development of current employees. Efforts to date demonstrate that identifying problems is relatively easy; defining and implementing solutions is much more difficult.



The committee accepts responsibility for defining recommendations to management to address identified problems. Toward that end, several actions are under discussion including:

- Budget request for 2003
 - The Diversity Committee does not have a budget at present. A request will be made for FY03 funds to allow funding for division forums, speakers, a review of historical data, and outreach activities.
- Restructuring the committee
 - There is a consensus among non-management members that the presence of management on the committee hinders discussion. Under consideration are proposals for restructuring the committee to allow discussion of issues without management present. In this case, a protocol must be established for interaction between the committee and management to ensure a means for implementing change.
 - There is a consensus that committee members and the chair should be elected.
- Soliciting participation outside of the committee
 - The committee's success depends on widespread participation and input from a representative cross-section of division staff. Ideas discussed to date include creation of sub-committees to focus on specific issues, informal discussion sessions, and web-based discussion forums. The challenge for all of us is identifying actions that can improve retention, development, and workplace environment.

The committee is requesting input on these topics including suggestions for activities or events, committee structure, and ways to increase participation. Please send your comments to engdiv@lbl.gov or talk with any committee member. A list of members is available at:

<http://engineering.lbl.gov/committees/committeemembers.asp?CommitteeID=Diversity>.



Communications – Deb Hopkins, Paul Harris, Erick Herrarte

Website – Paul Harris

During the 90-day period of January 1 – March 31, 2002, more than 13,500 people visited the Engineering Division website. Roughly 75% of these visitors came from outside of the Laboratory. The A-Z index is the most visited site, followed by the division capabilities page.

Nearly 4000 people visited our largely incomplete capabilities page. Each of these visitors is a potential customer or partner, making it vitally important for all responsible parties to submit their capability write-ups and keep them up to date.

Applications

The Division Action Items database application is functional and in use. Authorized users are encouraged to visit <http://engineering.lbl.gov/actionitems/>.

The Funding Opportunities database application is under development.

Please direct all comments and submissions to engweb@lbl.gov.

Quick Tips



Quick Tips -Erick Herrarte, Daniel Pulsifer

You can capture what is displayed on your screen as a picture.

To capture EVERYTHING on your screen do the following:

- 1) on your keyboard press **Print Screen** (usually located above the **Insert** key)
- 2) open Microsoft Word or any photo/paint program and choose Edit > Paste from the menu.

To capture the ACTIVE window on your screen do the following:

- 1) on your keyboard simultaneously hold down the **Alt** and **Print Screen** keys
- 2) open Microsoft Word or any photo/paint program and choose Edit > Paste from the menu.

Please direct any computer related questions or article suggestions to: guru@lbl.gov.



New Initiatives – Joe Jaklevic

The Engineering Division began the process of allocating funds to support a number of projects proposed by division staff. For those who are still working to develop ideas, there remains a possibility for funding of additional projects subject to the usual budgetary restrictions.

The projects that were approved by the New Initiatives Committee are as follows:

- Microvalve Array for Gas Targets, Daryl Oshatz
- Millimeter Wave Antenna Feasibility Study, Phil Datte
- Neutron Detector Initiative, Bernhard Ludewigt
- Software for Wireless Networked Sensors, Erick Herrarte
- High-Resist Drift Detectors, Mark Amman
- Neural Network Applications Development, Bart Davis
- Digital Signal Processing, Morgan Burks

Matlab Software – Bart Davis

Using funds provided by the New Initiatives Committee, Bart Davis has acquired and installed Matlab software including the following toolboxes: symbolic math, optimization, statistics, fuzzy logic, and neural networks. Many other toolboxes are available. Bart attended a Matlab training course in March, and is working to identify projects where this software would be useful.

Technology Transfer and Industry & Energy Partnerships – Deb Hopkins

New Project with ESD and the Petroleum Industry – Fred Reverdy

The objective of a project initiated in the Earth Sciences Division (ESD) in collaboration with Chevron, British Petroleum (BP), Conoco, and Core Lab, is to develop a capability to characterize the elastic anisotropy of compacting clay-rich samples, simulating compaction at depth. There is a growing concern that not correcting for anisotropy in the overlying reservoir strata can detrimentally affect efforts to image reservoir structure and estimate reservoir properties using seismic methods. New data on the anisotropic properties of compacted clay-rich rocks can be used directly to achieve proper focusing



in anisotropic imaging, and provide amplitude corrections for amplitude versus offset (AVO) techniques for hydrocarbon exploration and development.

Kurt Nihei from ESD and Fred Reverdy from Engineering Division proposed a laboratory-ultrasonic technique based on the synthesis of plane waves using linear-transducer arrays to recover the anisotropic elastic constants of these materials. The methodology was previously developed using a laser-ultrasonic technique described in Reverdy's Ph.D. thesis. A meeting was held at BP in Houston during March to present the technical approach that will be used to determine material properties. As a first step, measurements with different frequencies will be performed to determine the attenuation of longitudinal and shear waves in the samples. These quantities are important in determining the sample thickness that can be used, which will determine the dimensions of the compaction cell and the phased arrays.

Nondestructive Evaluation of Resistance Spot Welds – Fred Reverdy

Fred Reverdy and Deb Hopkins traveled to Detroit in January to meet with the project's industry steering committee composed of members from the Ford Motor Co., General Motors, and DaimlerChrysler, with expertise in nondestructive evaluation (NDE), materials, welding, and manufacturing. The group went through a "storyboarding" session to determine the needs of the automotive industry for nondestructive evaluation of resistance spot welds. The current status of commercial systems for inspection of spot welds was discussed, including reasons why these systems are successfully implemented in automotive plants in Europe and not in the United States. The group agreed that one of the major reasons that European automakers achieve much greater success with existing systems than their U.S. counterparts, is that they rely on highly skilled operators to perform inspections.

The Detroit steering committee has asked us to determine hardware and software solutions for reducing errors introduced by operators. The scope of work includes performing human-factor and error analyses, using NDE techniques to better understand how weld characteristics affect acoustic signals, and determining relationships between welding parameters and weld characteristics. As part of this work, Fred and Deb will attend a week-long training session offered by one of the major manufacturers of spot-weld inspection systems to gain personal experience with the system, discuss performance issues with future users, and help determine the type of errors introduced by human operators. Results from commercial systems are also being compared to NDE images obtained using infrared thermography, and from acoustic microscopy experiments conducted at the University of Kumamoto, Japan.



Hazard Mitigation – Murat Karaca

Deb Hopkins and Murat Karaca attended the annual reception hosted by the Collaborative for Disaster Mitigation (CDM), managed by the San Jose State University Foundation. Attendees included representatives from the Office of Emergency Services and California Seismic Safety Commission, as well as Silicon Valley executives, professors from San Jose State's College of Engineering, and the mayor of Sunnyvale. There were many interesting discussions about earthquake hazard mitigation work underway in California.

Murat Karaca and Bart Davis attended a February meeting at a Dana Street apartment building in Berkeley, where the residents are concerned about the seismic safety of their homes. Other participants included UC Berkeley Professors Vitelmo Bertero and James Kelly, Thomas Tobin, ex-CEO of the Seismic Safety Commission (SSC), Arietta Chakos from the City of Berkeley, Wayne Low from Degenkolb Engineers, and several building residents. After examining blueprints of the building, the group discussed possible weaknesses in the structure and how they might be addressed to improve safety. The same group met again a month later at Berkeley City Hall, together with an engineer who worked on the construction of the Dana Street building. We will continue to work with the group, and are looking for opportunities to develop sensor applications that would provide new information about the response of the building to seismic loads.

Richard McCarthy, current CEO of the California SSC, and Senior SSC Engineering Geologist, Robert Anderson, visited Engineering Division in February. They summarized the Commission's work, and provided guidance on opportunities for collaboration. They also provided information on research underway in the field of earthquake hazard mitigation in California.

Erick Herrarte and Bart Davis attended the Workshop for Crisis Response hosted by the California Institute for Telecommunications and Information Technology at UC Irvine. Presenters included representatives from the Federal Emergency Management Agency (FEMA), county and city Offices of Emergency Services and Management, and the Army Corps of Engineers. The National Science Foundation (NSF) program director for Sensors Technology, Shih Chi Liu, provided an overview of NSF sensors research. Erick attended the Distributed Computing and Networking breakout session in the afternoon, while Bart attended the Planning and Decision Support session.

Arietta Chakos from the City of Berkeley visited Engineering Division in March to discuss engineering capabilities, future research directions, and possibilities for collaboration.

Murat continues to actively participate in the hazard mitigation community that includes colleagues in his native Turkey (see *Significant Events Report*, [July 2001](#)). On February 3, 2002, a 6.2 moment magnitude earthquake occurred in the Afyon province of western Turkey causing many deaths. The earthquake occurred in a “seismic gap” (a location where there had been relatively little seismic activity compared to other areas along the fault).



A collapsed multi-story reinforced-concrete building following the Afyon Earthquake.
Photo used by permission, courtesy of the Turkish newspaper [Milliyet](#) (February 3, 2002).

Wireless Sensor Networks – Erick Herrarte and Bart Davis

With funding provided by the New Initiatives Committee, Erick Herrarte and Bart Davis ordered components for wireless sensor networks from Crossbow Technologies, including two PC interfaces, a dozen processor/communications boards, and ten sensor boards. Eight of the ten sensor boards have light, temperature, and acoustic sensors; two are additionally equipped with magnetometers and dual-axis accelerometers. Erick and Bart will be experimenting with networks to sense occupancy in Building 46. Bart will also be measuring the small earthquakes that occur in his office every time the bus drives by.

Wireless sensor networks promise to be accurate and dependable, with the additional advantages of being inexpensive, unobtrusive, and easy to install and maintain, especially compared to retrofit hardwiring. Bart and Erick are looking for opportunities to showcase some of these advantages in applications. With Murat Karaca, they are pursuing a seismic-monitoring project with the City of Berkeley and a project with Jim Lutz of EETD, to measure the utilization of energy services in buildings.



Mining – Daniel Türlér and Deb Hopkins

Tunneling Innovation and Opportunity

A paper titled “Drilling and Blasting Optimization Through Integration of Geophysical, Mineral-Content, and Drilling Data” has been accepted for publication and presentation at the Tunneling Innovation and Opportunity Toronto 2002 conference that will take place in Toronto, Ontario, in July. The meeting will encompass technical sessions from both the 5th North American Rock Mechanics Symposium and the 17th Tunneling Association of Canada Conference.

SME Conference and Tradeshow in Phoenix

Daniel Türlér and Deb Hopkins attended the 2002 Society for Mining, Metallurgy, and Exploration (SME) Conference and Trade Show in Phoenix, Arizona. Daniel presented a paper titled “Improved Process Control Through Real-Time Measurement of Mineral Content,” by D. Türlér, M. Karaca, W.B. Davis, R. Giauque, and D. Hopkins. Mining engineers, along with representatives from state and federal agencies and suppliers, met to discuss and showcase new technologies and techniques. Topics discussed included ore exploration; extraction and processing; mechanical-process machinery such as crushers, conveyers, pumps, and separation systems; environmental technologies; and software for process control and mapping. We are now following up with attendees who expressed interest in Engineering Division’s on-going project to develop an online dust-collection and analysis system that will allow borehole logs to be constructed based on mineralogy and rock properties identified using x-ray fluorescence (XRF) spectroscopy.

Field Experiments at the Sierrita Mine in Arizona



360-degree View of the Sierrita Mine

Immediately following the SME meeting, Daniel and Deb joined Earth Science’s Ramsey Haught, Jorge Segui, Ph.D. student at the University of Queensland in Australia, and Professor John Kemeny from the University of Arizona at the Sierrita open-pit copper mine near Tucson for ten days of field tests. Several experiments were conducted simultaneously to collect data during the drilling of a series of boreholes.



The mine is a drilling and blasting operation; once drilled, the boreholes are filled with explosive and blasted. A newly improved dust-collection system was used to sample dust and cuttings during drilling. Jim O'Neill and the Technical Integration Group modified the original system, field tested last year (see *Significant Events Report*, [July 2001](#)), to improve performance and ease of use. After some experimenting to determine the best placement of the collecting nozzle, the system

successfully separated dust and cuttings out of the borehole exhaust stream. Samples were collected continuously during drilling of the 60-ft holes. The collection jars were changed at five-ft intervals.

The location where the field tests took place included a highly fractured fault zone that posed challenges for the dust collection system. In fracture zones, the dust and cuttings produced during drilling tend to be deposited in fractures that intersect the borehole wall, so that very little dust gets transported to the surface. In addition, the drilling proceeds very quickly. It took as little as eight minutes to drill a hole in the fault zone, whereas it took an hour to complete the most difficult hole. Water also poses a problem in collecting samples; water conditions vary widely from hole to hole on the same bench, with some holes being completely dry while others are full of water. In wet holes, most of the dust is turned into mud that causes a buildup of material on the collecting-nozzle screen. In spite of the problems, more than one hundred samples were collected and shipped back to Berkeley for XRF analysis.

Fractures in the rock play a very significant role in blast fragmentation. Although parameters such as penetration rate and pull-down force that can be obtained from existing drill systems are related to the degree of fracturing in the rock, a more direct measure of fracture properties is highly desirable. The Technical Integration Group (TIG) in Building 25 fabricated an instrumented drill collar to determine the feasibility of using accelerometers to measure vibration during drilling.



ESD's Ramsey Haught installing the drill collar.

Earth Science's Ramsey Haught worked with TIG on the design of the collar, and Engineering's Valerie Risk installed the electronics and a wireless data transmission system. Vertical and tangential capacitive accelerometers were installed in the drill collar with a bandwidth of 400 Hz and a range of +/- 40g. Data was transmitted via FM radio at 418 and 433 MHz to a PC-based data-acquisition system. The collar and wireless system allowed collection of data continuously during drilling with minimal impact on the rig and drilling operation. The system performed flawlessly, and the data collected is now being analyzed to determine if it can be used to infer information about rock and fracture properties.

Cross-hole radar surveys were conducted using a zero-offset profile method to obtain arrival time versus depth in adjacent boreholes. The borehole radar system was operated at either 50 MHz (for hole spacings between 20 and 30 feet) or 100 MHz (for hole spacings less than 20 feet apart). Although radar is not a potential measurement-while-drilling technology, surveys may be cost effective for rock-mass characterization in geologically complicated areas. Radar has the advantages of being relatively fast and inexpensive. In addition, coupling with the rock mass is not an issue. However, achieving adequate penetration of the rock mass can be a problem. The sampling depth depends on the resistivity of the rock; depth penetration is on the order of tens of meters in high-resistivity zones, dropping to centimeters in areas of low resistivity. The dependence on resistivity also means that radar is very sensitive to water content. This can be problematic in open-pit mines where water conditions can change dramatically over the course of a few hours. The radar data will be used to help interpret data collected during drilling, and to determine the ability of the radar to delineate the fault zone.



Cross-hole Radar Survey

A video camera was used to image borehole walls, and students from the University of Arizona mapped fractures on the rock walls surrounding the bench. To characterize blast results, our partners at the University of Arizona and Split Engineering are using image-analysis techniques to quantify post-blast fragmentation of the rock mass. The volumes of data collected during the field test will be analyzed during the next few months to determine relationships between data collected during drilling and blasting results.

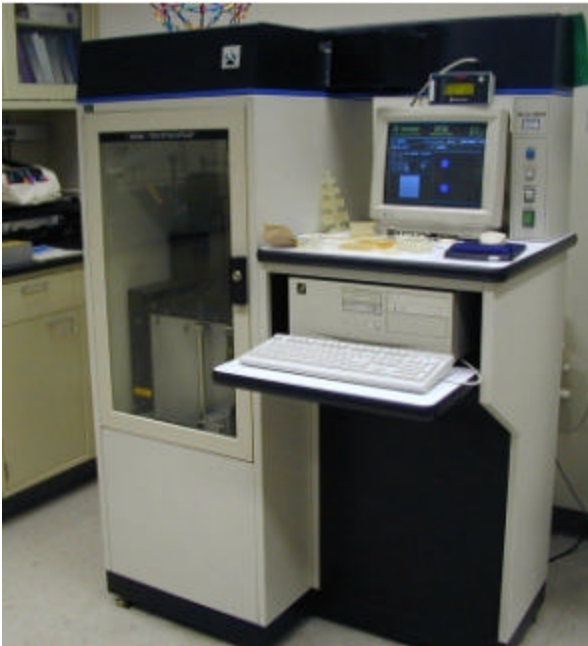
DesignWorks – Ken Chow

Accomplishments

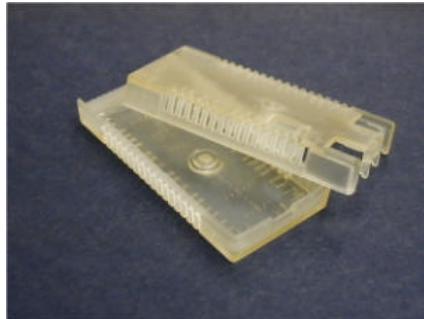
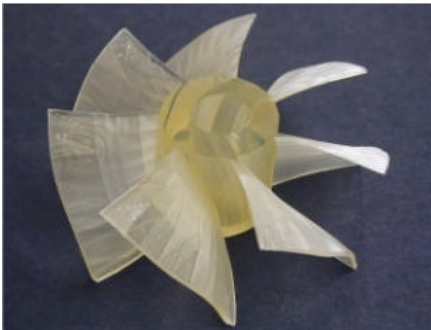
Our second rapid-prototyping machine, a 3D Systems SLA250, is fully installed and actively producing parts. Our first machine, a Stratasys Fused Deposition Modeler

(FDM), was installed last year (*Significant Events Report*, [October, 2001](#)). The new machine uses a stereolithography process to make parts, building an object one layer at a time by curing photosensitive resin with a laser-generated beam of ultraviolet radiation. The SLA250 allows us to use different materials and expands our rapid prototyping capabilities.

For more information on the rapid prototyping capabilities and services in DesignWorks, visit http://www-eng.lbl.gov/~dw/services/RapidPrototyping/RP_services.htm.



SLA Rapid Prototyping Machine



Sample stereolithography parts created on the SLA250.



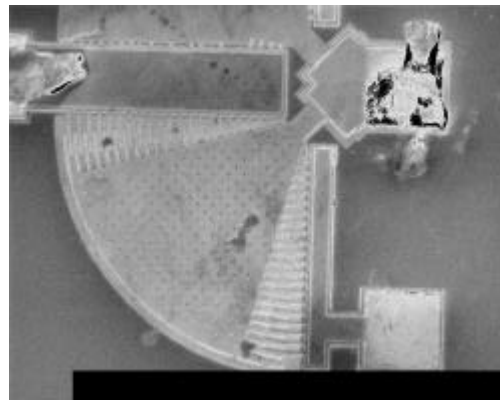
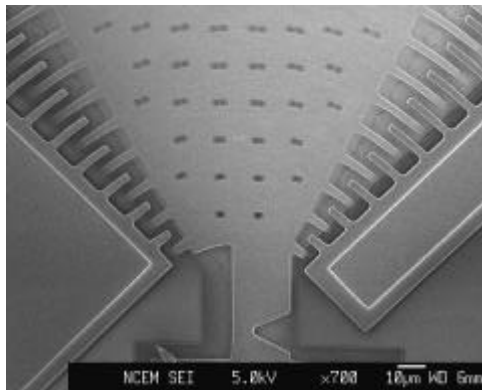
An article on DesignWorks was written in *Berkeley Lab Currents* ([March 22, 2002](#)) to introduce DesignWorks to a greater audience and to communicate some of the changes occurring in the Engineering Division.

Technical Integration Group – Jim O’Neill

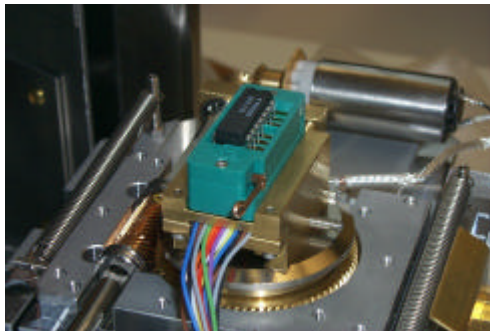
The Technical Integration Group continues to have a busy year. Our efforts remain focused on accomplishing customer goals and meeting commitments.

Accomplishments

- The National Center for Electron Microscopy (NCEM) MEMS stage was installed and performed well. The stage allows MEMS devices to be easily mounted to the existing motion-control system of an electron microscope. The MEMS devices are then studied to analyze failure modes and mechanical properties. As an example, prototype MEMS accelerometers and the stage are pictured below.



MEMS Accelerometers



MEMS stage mounted on motion control system.

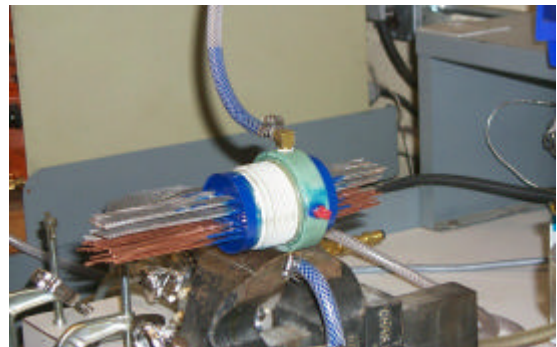
- Designs for new Transmission Electron Microscope (TEM) probes are underway.

- The Radio Transmission Drill Collar, built for the Division's mining project, was completed and field tested in March. Vertical and tangential capacitive accelerometers were potted in epoxy in a steel collar. A wireless system (see article in the Industry and Energy Partnerships section above) was used to transmit data from an operating drill rig. The system performed as designed, and we're anxious to see the results produced from the reams of data collected.



Receiver Circuit for Drill Collar

- The Environmental Chamber design for EETD is progressing. We are currently waiting for requested quotes from modular panel vendors. Specifications for the fans and cooling system are being developed for the chambers that simulate indoor and outdoor environmental conditions.
- The second prototype of the LHC Lambda Plug proved successful, surviving 50 thermal cycles from liquid nitrogen to room temperatures, and passing vacuum tests. For the vacuum tests, a positive pressure of 20 psi is applied to one side, while a vacuum on the other side simulates working conditions. The next prototype is in development and will incorporate a final-flange mockup and a test pressure of 400 psi.



LHC Lambda Plug

- Parts for the ALS Long Trace Profiler (LTP) have been delivered; installation will follow. The LTP has taken a lower priority to other ALS work commitments.
- The ALS Beamline 10.3.2 monochromator upgrade design is complete; fabrication is nearly complete. Trial assembly is underway, and installation for early April is on target.



Lawrence Berkeley National Laboratory
Engineering Division
Significant Events Report
April 2002



Flexure & Notch Hinges



Huber Setup

- Modifications are also in progress on ALS Beamlines 5.3.1 and 11.3.1; the modifications to Beamline 11.3.1 are in the early stages of scope definition and design.
- Projects and customers including SNAP, JGI, Ridge Filter, and IBT continue to have on-going technical needs that have to be addressed.
- The grinding room is finished. Many of the other shop organizational issues are still pending and are being accomplished as time permits. Acquisition of modern new machines is progressing slowly.
- John Schaffer has joined our group to manage the plastics work in Building 25. John was hired in January to replace the retired Don Jourdain. John brings talent and experience in several key areas that will help our group. We want to assure our customers that we're still in the plastics business.

Issues

- Our group is still in the building phase and we continue to look for key people to fill specific positions. Our primary focus is maintaining responsive, quality service to our customers. At present, an influx of new work makes it more pressing to add personnel. We welcome the new work as an opportunity to create an environment where a new generation of expert technicians can be trained and mentored.



Planned Actions

- During the next quarter, we hope to finalize the shop floor plan and add a new mill center. Training on the new machine will follow. Once the mill is installed, the next step is to identify a CNC lathe suitable for our R&D prototype environment.
- Installation of a 50-KIP MTS load-frame system will occur during the next quarter.
- In the near term, work for the ALS will consume most of our effort in preparation for the April shutdown.

Organization

Design & Fabrication – Lowell Koht

Process Engineering – Guy Pulsifer

Ultra-High Vacuum Cleaning Facility

Accomplishments

- The Ultra-High-Vacuum Cleaning Facility submitted a proposal to build a closed-loop waste-treatment system. This system would prevent any hazardous waste from exiting our facility, ensuring the highest level of safety. Karin King from DOE, Oakland, oversees the funding for proposals of this type. She supports our proposal for a closed-loop system and will visit our facility in April. A funding decision should be made by mid May.

Vacuum Coating Shop

Accomplishments

- Nanotubes were successfully grown in the plasma-enhanced chemical-vapor-deposition chamber. Nanotubes have potential applications that include telecommunications, lasers, and computer monitors.



Nanotubes Emitting Light

Welding Shop

Accomplishments

- A radial-arm drill press was installed in the Welding Shop. A new shear machine will be installed, enabling the shop to shear one-half-inch-thick steel plates up to ten feet long.

Electronics Engineering – Peter Denes

ALS Electronics – Walter Barry

Accomplishments

- New energy-efficient klystron-beam current-control circuitry for the ALS storage-ring RF system has been developed and brought into operation. The system reduces klystron-beam current as the storage-ring current decays; the reduction in power results in estimated cost-savings of \$100k per year.
- Higher-order-mode dampers for the storage-ring RF cavities have been developed and successfully bench tested. They will be installed on the storage-ring cavities during the April shutdown. The cavities will reduce the load on the coupled-bunch feedback systems allowing further tuning of the third-harmonic cavities for maximizing beam lifetime.
- The transverse and longitudinal coupled-bunch feedback systems have been instrumented with broadband web-enabled scopes for monitoring kick and other signals.
- New digital filters for rejecting mode zero in the longitudinal feedback system have been successfully implemented.



- The ability to perform complex transfer-function measurements with the transverse feedback system during normal user operations has been demonstrated. This diagnostic is extremely important for monitoring beam stability.
- A design plan review of a proposed coherent far-infrared storage-ring facility at the ALS was held. The EE group presented design plans for coupled-bunch feedback systems and conventional accelerator instrumentation and diagnostics.

Issues

- Leon Lin, an intern with the RF group, is modeling higher-order-mode damper designs for the third-harmonic cavities using various electromagnetic codes. Leon spent the first six months of his internship addressing RF issues at the 88-inch cyclotron.
- The EE group is losing one engineer and one associate to retirement over the next two months. Both are involved in, among other things, radiation-system-safety design. We are currently training another associate in the design aspects of these systems.

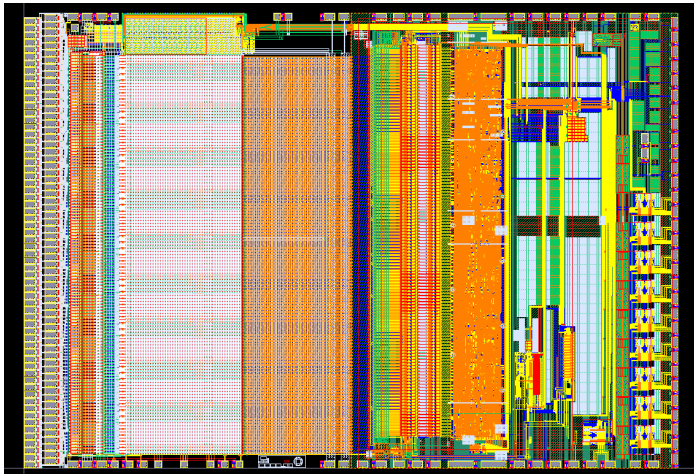
Planned Actions

- We are currently addressing the impending manpower shortage referenced above.
- We may hire up to two undergraduate students for summer positions in the instrumentation group.

Accelerator Electronics –Will Waldron

In March, the fabrication of pulsed-power electronics for a 2-ms linear-induction accelerator was completed in the Building 25A Electronics Shop. There will be continuing engineering support for the hardware at Los Alamos National Laboratory. Congratulations to the Building 25A shop for a job well done.

Prototype Submission of SVX4 – Henrik von der Lippe



SVX4 Integrated Circuit Prototype

In March, the SVX4 IC design team, headed by Brad Krieger, submitted the SVX4 Integrated Circuit (IC) for prototype production. We have been working on designing this IC for one year. The IC is a 128-channel readout circuit for silicon strip detectors. Each channel consists of a preamplifier, analog pipeline and ADC. The IC will be used in the next upgrade of the Collider Detector at Fermilab

(CDF) and D0 experiments at the Tevatron Collider at the Fermi National Accelerator Laboratory (FNAL). The LBNL team of IC designers includes Emanuele Mandelli, Gerrit Meddeler, Henrik von der Lippe, and Jean-Pierre Walder. In addition to the LBNL IC designers, IC designers from FNAL and the University of Padova, Italy, have participated in the project. An especially challenging design task was utilizing a deep sub-micron IC process to increase the radiation tolerance, one of the main requirements for the IC.

Spallation Neutron Source – Alex Ratti

Accomplishments

- The LEBT chopping structures were re-packaged and successfully tested with and without beam. Beam measurements during the RFQ testing showed a rise/fall time of less than 40 ns, exceeding the initial requirement set by the SNS. Jim Greer led this effort.
- The RFQ fabrication and installation is complete. The device was commissioned with beam. A series of beam characterization measurements indicated that it meets all specifications.
 - This event was featured in *Berkeley Lab Currents* ([February 8, 2002](#)).
- After beam commissioning, RF conditioning was completed by Jim Ayers, who leads this effort, by retuning the klystron and modifying the profile of the focusing magnetic fields around the tube. Conditioning continued until the cavity reached its full operating duty factor of 6% at full gradient.



Lawrence Berkeley National Laboratory
Engineering Division
Significant Events Report
April 2002

- To complete the beam measurements, the group completed and commissioned a slit-and-collector-based emittance-measurement system, based upon a commercial 32-channel 5-MHz digitizing board.
- In preparation for the MEBT commissioning, all vacuum and water-cooling systems were interfaced with the control system. The boxes that house these interfaces were fabricated, installed, and wired to the beamline devices. Peter Cull leads the programming of the protection devices; all installation activities are led by Marek Szajbier, supervised by Bill Strelo, and carried out by the SNS technicians, Tin Kuneli, Mark Regis, and Nathan Ybarrolaza with the help of Bill Lau and the crew in Building 25.
- The dedicated low-level RF system (LLRF) for the MEBT rebuncher cavities is being completed on time for the MEBT commissioning. This is a hybrid analog and digital system, which is used to ensure the proper relative phasing between systems, as well as to perform amplitude and phase controls to one-percent and one-degree accuracy. Larry Doolittle leads this effort with the support of Marco Monroy and CC Lo.
- Bill Abraham, Steve Patterson, and Tom Downs provided the needed guidance for installation of all cable trays and cabling of the MEBT hardware as created in Allan Harris' 3D layouts. They are also completing the documentation package to be delivered with the system.
- The supporting networking and trigger distribution infrastructure are also complete.
- An Activity Hazard Document (AHD) has been prepared in collaboration with EH&S to authorize testing with beam, in an environment that can create x-rays resulting from the high fields in the RF cavities and neutrons arising from secondary emission on copper and molybdenum surfaces.

Planned Actions

- The SNS front-end electronics will be completed in early April.
- The full injector will be tested with beam until June, when it will be packed and shipped to Oak Ridge National Laboratory (ORNL).
- The LBNL portion of the SNS project will be completed with the re-commissioning of the beamline at ORNL later this year.



Software Engineering – RP Singh

Accomplishments

- Eugene Veklerov is working to develop a new capability that will allow progress on nanofabrication to be monitored with a web browser.

ALS Controls – Alan Biocca

- Preparations continue for the upcoming April shutdown. The controls for 150 power supplies in the storage ring will be affected by hardware and software changes.
- The extended-precision rear I/O boards have been fabricated and are being prepared for installation during the shutdown. These boards will provide 20-bit resolution to improve feedback performance and minimize controls-induced noise in the beam.
- The Windows 2000 upgrade for the control room consoles is complete. Upgrading to Active Directory Services is planned, but not yet scheduled.
- A detailed analysis of the recovery problems from the recent power outage has been initiated with the goal of reducing downtime in the future.
- Additional uninterruptible power supplies have been ordered for several systems including the ALS Distributed Name Server (DNS) and the ALS_CONTROLS NT Domain Controller. These steps will help reduce downtime after power events.
- Motor controls for the new Sector 11 EPU have been tested and are working, although some issues are still being examined.

Advanced Light Source – Alan Paterson

Accomplishments

- All three of the new Protein Crystallography Beamlines using superbend photons are operating and taking data. A significant number of protein structures have already been identified using these new facilities.
- The three new beamlines have novel “mini-hutch” experimental endstations and were completed by an engineering team that included Rob Duarte, Dave Plate, Daniela Cambie, Nicholas Kelez, Mike Kritscher, Curtis Cummings, Lionel Bonifas, Rob Patton, and Andy Lim.

- Molecular Environmental Science (MES) Beamline progress
 - The monochromator with "dummy" optics has been assembled and tested; design improvements have been implemented. The critical requirement that the operation not be adversely affected by vibrations caused by the flow of cooling water or forces generated by water pressure, has been met.
 - Bill Gath, Dave Anderson, and Jim Dougherty of the Assembly Shop assembled the Elliptically Polarizing Undulator (EPU) on schedule. This device was delivered to the ALS in February and is undergoing magnetic characterization prior to installation in the ALS during the April shutdown.
- Three new engineering teams have been formed for beamline projects.
- Two new major projects, SIBYLS, and High Pressure, have extremely aggressive schedules to meet the needs of the customer. In order to meet these needs, two teams have been formed. The first, under the management of Dave Plate, will execute beamline engineering for both projects. This is possible because the beamlines have many identical components. The second team, managed by Rob Duarte, will engineer the end stations for both of the projects. In this way, the engineering for the beamlines and end stations can progress simultaneously, reducing the overall project timeline.
- The West Coast Group, which includes JPL and Sandia Laboratories, has authorized the engineering of a new LIGA Beamline at Sector 3 of the ALS. Funding for this new project was received in March. Nicholas Kelez, Tony Catalano, and Ray Low are working on this new facility, which is scheduled to begin operation after the ALS November 2002 shutdown.
- Improved Superbend cryogenic performance achieved.
 - Initial operation of the ALS superbend magnets indicated an unacceptably high heat leak that was attributed to the detail design of the delivery nozzle on the external cryogenic transfer lines. These "stingers" are not needed for normal operation, and are not essential for operation on cryogenic fluids, and were thus removed. Tests with a modified end detail on the spare superbend magnet have demonstrated that the original heat leak is eliminated. The modified stingers will be retrofit to all three installed magnets during the ALS April shutdown. The stingers permit easy switching to cryogen operation, should a cryocooler fail in any of the magnets.



- First internal review held for the Infrared Ring.
 - In March, the collaborative team of engineers and physicists presented plans for developing the conceptual design for the proposed infrared-storage ring to be built on the ALS booster ring tunnel. This valuable review has focused the team on designing for an operating mode where the photons generated in the new ring will behave in a coherent mode. This mode produces extremely large fluxes with operation at low currents, but will likely require superconducting cavities. The cavities are needed to provide radio-frequency power to electron bunches that are extremely short, on the order of 100 microns.
- Improved operation of the monochromator on Beamline 9.3.1
 - Rich Weidenbach received a commendation from Fred Schlachter of the ALS Scientific Support Group for his work on this monochromator. At present, the monochromator can scan over a very wide energy range with virtually no beam motion or change in intensity. This performance was unattainable with previous designs and is permitting the users to do new science.

Issues

- Completion of all fabrications on schedule for installation during the ALS shutdown in April, along with the coordination of all shutdown activities.
- A very large level of effort is required from the ALS Survey and Alignment crew during the April shutdown. The entire ring and many beamline front ends will need to be surveyed and aligned as needed.
- On schedule completion of the MES project by October 2002. The engineering of the experimental end station is on the critical path for this project and requires information from research groups outside of LBNL.
- The very aggressive schedule needs of the customers for the SIBYLS and High Pressure Beamlines.

Planned Actions

- Some 350 separate activities have been identified for the April shutdown; a schedule has been developed to level resource needs and eliminate conflicts.
- An outside survey contractor has been hired to supplement the work of the ALS Survey crew.



Spallation Neutron Source – Ron Yourd

During January, a significant SNS Project milestone was met at Berkeley, when the first ion beam was accelerated out of the radio-frequency-quadrupole (RFQ) accelerator; the RFQ is the third and perhaps most technically challenging of the four components in the SNS front-end system (FES). The 2.5 MeV beam came out at a current of 24 milliamps on the first try. A series of experiments during the following week enabled a full characterization of the beam to be performed. All indications are that the RFQ is performing excellently, and all technical requirements have been met. The event was described in a recent *Berkeley Lab Currents* ([February 8, 2002](#)) article.

The Medium Energy Beam Transport (MEBT) section is also making excellent progress. All systems and sub-components have now been installed and aligned onto one of the three rafts supported by the MEBT frame structure. Electronic systems are being installed, wired, and checked out, and instrumentation and beam diagnostic components are being characterized. First ion beam tests for the MEBT system are planned for early April.

The control system and the integrated testing program continue to make excellent progress overall, and all apparatus is being installed and tested incrementally as they become available. A busy schedule of FES integrated-beam testing is planned for the next couple of months. Disassembly and shipment of the completed SNS Front End System to ORNL is planned for June 2002.



Division Support

Administrative Services – Bob Liu

Accomplishments

- The administrative support structure has been modified to better serve the customers. The matrixed customers are now responsible for day-to-day supervising, while the ASD supervisor is responsible for the staff members' training, career development, P2R process, etc.
- Karen Paris has been assigned responsibility for supporting the Division Director in non-recurring special projects.

Environmental Safety & Health – Weyland Wong

The accident/injury rate for the Engineering Division is high again this year. As was the case last year, we have had an increase in our accident/injury rate during the months of March and April. The year-to-date overall accident/injury rate is about the same as last year, but the number of DOE-recordable cases is considerably higher than in years past. Last year, through the month of April, we had nine DOE-recordable accidents/injuries. This year, we are not quite through April, and we have had twelve DOE-recordable accidents/injuries.

These statistics are important indicators of how we are performing our ES&H functions, and the level of safety awareness within the organization. Paying attention to what we are doing with respect to safety must be important to each of us.

Self-Assessment – Barbara Davis

Accomplishments

- All Engineering Division space has been inspected by the Self Assessment Teams. FY2002 Self Assessment Inspections are now complete. Thank you to all of the teams for their participation.

Actions

- Correct all findings.
- Complete the validation process.
- Finalize report to EH&S and DOE.



Sponsored Research Administration – Lisa Rebrovich

Accomplishments

- The FY02 estimated spend plan is \$7.5M. The management report spend plan may be reduced in April to \$7M, depending on projected major purchases this fiscal year.
- Funding received to date is \$7.2M.
- Fifty-two projects are open, of which ten are newly funded projects.
- Sixteen proposals have been prepared to date; several others are in the works.
- Fifteen proposals are pending; we anticipate funding for several of these proposals, including three that are renewals or continuation work.
- The annual Budget Formulation for FY04 was completed in March. The Budget Formulation provides DOE with a projection of our spending for FY02-FY08, and establishes a cost ceiling for programs.
- All DOE projects have received at least 85 percent of their funding as of March 27. There are a few projects that have received 100 percent of funds. The remaining funds are expected to be released in the next month.

Issues

- Overruns – PI's need to continue to work closely with Lisa as their projects near completion and funds are dwindling down. Lisa can provide you with estimates so that you don't overspend your project in the last month. Overruns get reported to DOE as unbilled costs. We need to be careful not to overspend the amount available to the project.
- Certain funding agencies are very slow in granting us no-cost extensions, which means that work has to stop on the project until extensions are granted. We have been requesting no-cost extensions at least 3-4 months in advance, and we will continue to make requests as soon as we know an extension is required.

Planned Actions

- The institutional plan, an annual DOE reporting requirement, is due to the Budget Office by April 2. The purpose of the institutional plan is to provide an overview of the Lab's current mission, strategic plan, issues, research programs, and activities, as well as initiatives for new programs and facilities. It also serves as a basis for cross-lab comparison, a marketing tool for the Lab, and a briefing



document for the May DOE On-Site Review; the plan also allows resource projections (funding and FTE) for FY01 – FY07.

Finance – Bob Liu

Accomplishments

- The Division's working budgets are evolving as department heads and group leaders, under the Director's instruction, formulate departmental training programs.
- All departments' quarterly spending plans were updated based on their revised budgets.
- Supported Design & Fabrication Department in revising its average recharge rate from a standard \$30 per hour to the actual effort cost. DOE is currently reviewing the rate case.
- Supported Design & Fabrication Department in proposing a recharge mechanism for recouping the DesignWorks infrastructure costs. DOE is currently reviewing the rate case.
- Worked with the LBNL Accounting Office to revise our shop recharge rate.

Property & Space – Barbara Davis

Accomplishments

- The property inventory is complete. We found 99.7% of our property. Thank you to everyone for helping with the inventory.

Actions

- Continue to evaluate Division space.
- Re-align space to make it easier for departments to function.

Table of Contents

<u>Division Director's Comments</u>	<u>1</u>
<u>News.....</u>	<u>3</u>
DesignWorks Featured in Currents	3
Professors from Chico State Visit Lab	3
Division Capabilities Presented at Livermore	3
Cryo3 Radiation Detector Profiled on DOE Website	3
<u>Features</u>	<u>4</u>
"Frigin'-A It Works!"- Deb Hopkins and Paul Harris	4
<u>Profiles</u>	<u>7</u>
Cleaning Up Engineering – Paul Harris	7
Service Recognition – Pamala Williams-Perkins	8
Retirees - Leslie Cobb	8
Student Hires – Leslie Cobb	9
<u>Significant Events</u>	<u>10</u>
Student/Internship Committee – Bill Edwards	10
Job Fairs and Recruitment – Rita McLean	10
Shadow an Engineer Program	10
Diversity Committee – Deb Hopkins	10
Communications – Deb Hopkins, Paul Harris, Erick Herrarte.....	12
Website – Paul Harris	12
Quick Tips -Erick Herrarte, Daniel Pulsifer	12
New Initiatives – Joe Jaklevic	13
Matlab Software – Bart Davis.....	13
Technology Transfer and.....	13
Industry & Energy Partnerships – Deb Hopkins.....	13
New Project with ESD and the Petroleum Industry – Fred Reverdy	13
Nondestructive Evaluation of Resistance Spot Welds – Fred Reverdy	14
Hazard Mitigation – Murat Karaca	15
Wireless Sensor Networks – Erick Herrarte and Bart Davis	16
Mining – Daniel Türler and Deb Hopkins	17
Tunneling Innovation and Opportunity	17
SME Conference and Tradeshow in Phoenix	17
Field Experiments at the Sierrita Mine in Arizona.....	17
DesignWorks – Ken Chow	20
Technical Integration Group – Jim O'Neill.....	21
<u>Organization</u>	<u>24</u>
Design & Fabrication – Lowell Koht.....	24
Process Engineering – Guy Pulsifer.....	24
Ultra-High Vacuum Cleaning Facility.....	24
Vacuum Coating Shop	24
Welding Shop.....	25
Electronics Engineering – Peter Denes	25
ALS Electronics – Walter Barry	25



Lawrence Berkeley National Laboratory
Engineering Division
Significant Events Report
April 2002

Accelerator Electronics – Will Waldron	26
Prototype Submission of SVX4 – Henrik von der Lippe	27
Spallation Neutron Source – Alex Ratti	27
Software Engineering – RP Singh	29
ALS Controls – Alan Biocca	29
Advanced Light Source – Alan Paterson.....	29
Spallation Neutron Source – Ron Yourd.....	32
<u>Division Support</u>	<u>33</u>
Administrative Services – Bob Liu	33
Environmental Safety & Health – Weyland Wong.....	33
Self-Assessment – Barbara Davis	33
Sponsored Research Administration – Lisa Rebrovich.....	34
Finance – Bob Liu	35
Property & Space – Barbara Davis	35